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Determination of the Diameter and the Compression of the Planet Mars from Observations with the Repsold Heliometer of the Royal Observatory, Göttingen. By Professor W. Schur.

(*Communicated by the Astronomer Royal.*)

The question of the compression of *Mars* is still open, as the former measures of the equatorial and the polar diameter may be influenced by errors of estimation to which the eye is liable in the measurement of discs in different directions with respect to the vertical line.

But since small reversion prisms are used on the eyepiece of the heliometer, with which the image of a celestial body, *e.g.* the line joining a double star or the diameter of a planetary disc, can be made to appear in any direction with respect to the vertical line, it is possible to get free from these subjective influences.

I have, therefore, awaited the opposition of *Mars* of this year, which is so favourable on account of the high declination of the planet, with great anxiety to observe the equatorial and the polar diameter with the said precautions.

All instrumental errors and the very small correction for defect of illumination according to the ephemeris of Mr. Marth are taken into account.

The diameter of the object-glass is 162 millimetres and the power used 174.

The following are results of four nights, where *v* and *h* denote the measurements with apparent vertical and horizontal movements of the images in the field of the eyepiece.

Date.	Mean Time Göttingen.	Areographic latitude.	Measured diameter.	Diameter in mean distance from the Sun.	Mean of *v* and *h*.
1896.	h m	°	″	″	″
Dec. 2	11 45	90	16·81*v*	6·19	6·15
			16·60*h*	6·11	
		0	17·06*v*	6·28	6·30
			17·16*h*	6·32	
		0	17·03*h*	6·27	6·23
			16·79*v*	6·18	
		90	16·66*h*	6·13	6·10
			16·49*v*	6·07	
11	10 19	90	16·52*h*	6·14	6·13
			16·45*v*	6·11	
		0	17·04*h*	6·33	6·30
			16·85*v*	6·26	
		0	16·92*v*	6·29	6·32
			17 09*h*	6·35	

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Date.	Mean Time Göttingen.	Areographic latitude.	Measured diameter.	Diameter in mean distance from the Sun.	Mean of v and h.
1896.	h m	°	"	"	"
Dec. 11	10 19	90	16·55v	6·15	6·14
			16·47h	6·12	
16	8 2	90	16·18h	6·12	6·10
			16·06v	6·07	
		0	16·44h	6·22	6·11
			16·43v	6·21	
		0	16·44v	6·22	6·21
			16·40h	6·20	
		90	16·11v	6·09	6·09
			16·11h	6·09	
17	9 36	0	16·46h	6·26	6·24
			16·34v	6·21	
		90	16·24h	6·17	6·15
			16·10v	6·12	
		90	16·06v	6·10	6·10
			16·06h	6·10	
		0	16·25v	6·18	6·24
			16·54h	6·29	

December 2 the images, principally in the beginning, were less steady, but on the other days pretty and sharp.

Taking the mean of the numbers in the last column, one gets for the axes of the Martian disc in mean distance from the Sun (log=0·18289).

1896.	"	"	
Dec. 2	$2a = 6{\cdot}265$	$2b = 6{\cdot}125$	$\alpha = \frac{a-b}{a} = \frac{1}{44{\cdot}7}$
11	6·310	6·135	$\frac{1}{36{\cdot}1}$
16	6·210	6·095	$\frac{1}{54{\cdot}0}$
17	6·240	6·125	$\frac{1}{54{\cdot}3}$

The mean for the four observing nights gives the compression nearly $=\frac{1}{47}$, and the diameters are—

$$2a = 6''{\cdot}256 \qquad 2b = 6''{\cdot}120.$$

Reduced to the distance, Earth-Sun the diameters are—

$$2A = 9''{\cdot}53 \qquad 2B = 9''{\cdot}32.$$

From the results of these observations, which in my opinion are perfectly free from any disturbing influence, it seems to be not doubtful that the compression of the planetary disc is nearly $\frac{1}{47}$.

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Remarks on the Physical Observations of Jupiter, made at the Adelaide Observatory, 1884–93. By E. P. Sells.

(*Communicated by Sir Charles Todd.*)

Drawings of *Jupiter* were made at the Adelaide Observatory, with the 8-inch Cooke refractor, from 1884 till 1893, with the exception of 1890.

It was early recognised that the utility of the drawings would be much increased if the two following conditions were complied with :—

(1) The drawings to be arranged for publication, not in the usual way of separate discs for each drawing, but on some cylindrical form of projection, allowing of easy comparison between the results obtained on different nights.

(2) As many drawings as possible to be taken on each night of observation, four or five drawings on one night being preferable to one drawing on each of four or five nights.

With regard to condition (1), the form of projection chosen was the orthographic, being the most natural projection for *Jupiter*. The drawings at the telescope were made on blank elliptical discs, as is usual, and were afterwards plotted on a chart having its polar diameter equal to that of the elliptical disc, the longitudes being taken from Marth's "Ephemeris," System II.

It will be seen from the accompanying planisphere that each night of observation has a chart to itself, and the different charts are arranged one below the other, and are separated from each other by only a thin black line, thus allowing of easy comparison *inter se.* The number of charts on a sheet is of necessity limited by the size of the publication of which they form a part, but it is, of course, an advantage to have as many charts as possible on each sheet. No latitude parallels are shown, as they would only confuse the eye, but meridians are given to every 30°, and along the top and bottom of the sheet to every 10°.

With regard to condition (2), drawings were made as nearly as possible at intervals of fifty minutes, answering to a difference of 30°·2 Jovian longitude. Attempts were made to secure sets of drawings showing the whole of *Jupiter's* surface during one revolution of the planet, but in no case was this satisfactorily accomplished, although on 1889 June 23–24 G.M.T. nine drawings were secured, of which the first and last slightly overlapped, so that on the planisphere the whole disc is delineated. On all occasions, however, observations were interrupted either by cloud or by a south-easterly breeze, the lightest breath of air from that quarter sufficing to destroy the quality of the definition, so that the true forms of the markings could not be made out, and all delicate detail vanished. Great attention has been paid at Adelaide to giving the markings their true forms (as they